

## EEG Correlates of Golf Performance: Training the Brain to Drain the Putt

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The link between sport performance and attentional processes is well established. The present research investigated relationships between golf putting performance and electroencephalogram (EEG) activity in two studies. In Study 1, putting performance of eight skilled male golfers (handicap  $\leq 4$ ) was assessed by absolute error over 60 trials, putting from 9m on a regulation green. EEG was measured at 19 sites – far more than in most previous studies – with two EOG and one EMG sites used for artefact reduction and removal. Data were divided into 15 frequency bands and three 500ms epochs prior to impact. Correlations between putting error and EEG amplitudes for each site, frequency and epoch showed substantial individual differences, suggesting a more complex process than has previously been found with fewer sites, frequencies, and epochs. Although correlations were small, the EEG frequency mostly closely associated with performance was in the beta range, specifically 19 – 20 Hz, rather than in the alpha range (i.e., 8 – 12 Hz) as identified previously. Intra-individual correlations identified the most pertinent sites and frequencies for subsequent individualized neurofeedback training, whereby electrocortical activity of specific frequencies at particular sites is rewarded or inhibited. In Study 2, four participants received neurofeedback training over 20 sessions during which visual and auditory reinforcement was provided when EEG activity met their individualised criteria. Putting performance was assessed before and after neurofeedback training. Results of Study 2 will be presented.